INL scientists Mitch Greenhalgh and Bruce Mincher (third and fourth from left) toured nuclear operations in Tokai Mura, Japan, through the Japan Atomic Energy Agency (JAEA) staff exchange program.

# Sister cities share nuclear research as a part of staff exchange program

by Jo Seely, *Nuclear Science & Technology communications intern*

Two Idaho National Laboratory scientists toured nuclear operations in Tokai Mura, Japan, through the Japan Atomic Energy Agency (JAEA) staff exchange program in November and December. This spring, two of Tokai Mura's own came to Idaho Falls to see INL contributions to nuclear research.

***The JAEA staff exchange program brought two Japanese scientists to INL for a two-month visit.***

In April, Yoshinobu Nakamura and Masahiko Yamamoto, from the JAEA Tokai Reprocessing Plant (TRP), traveled to Idaho Falls to see advanced fuel cycle research at INL. Months prior, Bruce Mincher, INL Directorate Fellow scientist and staff scientist Mitch Greenhalgh traveled to Tokai Mura to see their research being implemented.

"By traveling there, I have a better idea of what things have to be like on a large scale," said Mincher.

**Tokai Mura**
Population: 37,000
Sister City with Idaho Falls, Idaho
"Birthplace of Japanese Nuclear Power"
First Japanese Commercial Nuclear Power Plant

**Japan Atomic Energy Agency (JAEA)**
Established 2005
Member of GNEP

**AEA Tokai Reprocessing Plant (TRP)**
June 1971, Began Construction
By 1990, 500t reprocessed
By 2002, 1000t reprocessed
2006, Light Water Reactor Spent Fuel Reprocessing
Reprocessing Capacity: 0.7thm/day
Rokkasho Reprocessing Plant, will operate until 2050

**TRP Analytical Laboratory**
Built in 1975
2000 m2
Similar to the Hot Fuels Examination Facility at INL
Three Areas of Chemical Control:
Process Monitoring
Material (Accountability/Safeguards)
Quality of Reprocessing

At INL, Mincher and Greenhalgh have been looking into new methods for the reprocessing of used nuclear fuel within the Advanced Fuel Cycle Initiative. Although they had researched the PUREX process (plutonium and uranium recovery by extraction), they hadn't seen it on a commercial scale. The trip to Japan's TRP gave them that chance.

"It gave me an appreciation for the scale of reprocessing spent nuclear fuel and all that it involves," said Greenhalgh. "It becomes quite a massive operation."

The details of that operation were presented to INL employees by Nakamura and Yamamoto near the end of their stay. Nakamura described the TRP's nuclear fuel reprocessing to recover uranium and plutonium from commercial nuclear fuel. Yamamoto presented an introduction to the analytical laboratory methods and processes that support fuel reprocessing at TRP.

During Nakamura and Yamamoto's two-month INL visit, they were able to see the research under the Advanced Fuel Cycle Initiative. During that time, they toured INL's major nuclear research facilities, including the Experimental Breeder Reactor-I and -II, the Fuel Conditioning Facility (FCF), Advanced Test Reactor and the Hot Fuels Examination Facility, which is similar to TRP's Analytical Laboratory. They also visited the radiochemistry labs at the INL Research Center and INL's new Center for Advanced Energy Studies. At FCF, they got to see how EBR-II fuel is electrochemically treated, in contrast to the aqueous methods the Japanese use at TRP.

Tokai Mura is the Sister City of Idaho Falls and is considered to be the birthplace of Japanese nuclear power. Since the municipal relationship began in 1981, more than 800 individuals have traveled between the cities to share culture and knowledge.

"The program is really a tribute to international collaboration," said Greenhalgh. "We can research processes and then publish papers together."

Mincher agrees, "After all, two heads are better than one."

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